

Amendments to the Drawings

None

Remarks

The present invention is directed to a coolant delivery apparatus for a machine tool wherein the position of the coolant delivery apparatus comprising a plurality of coolant nozzles in fluid communication with a positionable coolant header is controllable such that coolant may be delivered to the machining zone of a tool even though the location of the machining zone of the tool may change such as during machining of a workpiece, or from one workpiece to another.

The current status of the claims is as follows:

1. Claim 7 is objected to as being of improper dependent form for failing to further limit the subject matter of a previous claim.
2. Claims 1, 3, 4, 6-8, 13-15, 17 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over EP 0 305 616 in view of Eckardt et al. (US 4,739,586).
3. Claims 9 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over EP 0 305 616 in view of Eckardt et al. (US 4,739,586) and further in view of Mason (US 1,924,162).
4. Claims 11 and 12 are rejected under 35 U.S.C. §103(a) as being unpatentable over EP 0 305 616 in view of Eckardt et al. (US 4,739,586) and further in view of Kalb (US 6,712,061).

Claim 7 has been objected to as being of improper dependent form for failing to further limit the subject matter of claim 1. The Examiner is respectfully directed to withdraw this objection in that claim 7 limits movement of the tool relative to the workpiece from one contact zone to another "along one axis of motion" while claim 1 recites the same movement as being "along at least one axis of motion". Therefore, claim 1 effectively recites one or more while claim 7 recites one only. Thus, claim 7 does further limit claim 1.

Claims 1, 3, 4, 6-8, 13-15, 17 and 18 are rejected as being unpatentable over EP

0305616 in view of Eckardt et al. (US 4,739,586). This rejection is respectfully traversed.

EP '616 teaches a body member 16 with attached coolant nozzles 17 positionable about a tool 13 so as to direct coolant to a machining point. The rotational position of the body member 16 is determined by the position of the machine work table from which the machining point on the workpiece is calculated and a signal is then outputted to compute the angle of rotation of the body member 16 to direct coolant to the machining point (column 6, lines 10-50). The computation of the angle of rotation of the body member 16 varies depending on the workpiece shape and therefore must be determined at each instance of a change to a differently configured workpiece.

Eckardt et al. disclose a glass grinding apparatus wherein a nozzle directs a jet of coolant to a grinding point S and wherein the nozzle is positionable to "follow" the grinding point S so that coolant is provided to point S regardless of its position. Applicant takes issue with the Examiner's statement "in a similar device" when discussing the devices of Eckardt et al. and EP '616. Eckardt et al. discloses a glass grinding machine while EP '616 discloses a machining center. Respectfully, these machines are not similar.

The Examiner's position is that Eckardt et al. "teaches that it is old and well known to connect the nozzles to the tool, so that movement of the tool between contact zones causes repositioning of the nozzles, using a servomotor." Respectfully, this summary is not entirely correct. Control units 9 and 13 cause pinion 17, via servomotor 23, to rotate in mesh with gear 16 in dependence on the rotation (pivoting direction) of the spindle arm 2 in order to reposition nozzle 6 (column 3, lines 14-30). Furthermore, control unit 13 comprises a sensing device 13a which is placed in contact with the edge 18 of the glass pane 1 and controls the pinion and nozzle 6 in dependence on the surface of the pane edge 18 (column 3, lines 46-49). Thus, it is the position of the workpiece and the pivoting direction of the spindle arm 2 that determine the repositioning of the nozzle 6.

In contrast, the present invention provides for repositioning of coolant nozzles based on movement of the tool in a synchronized manner along a machine axis. There is no dependence upon movement of the workpiece or a work table or a pivoting spindle arm, the shape of the workpiece, or the need to separately calculate a formula at each change to a differently configured workpiece. Claims 1 and 14 were previously amended to include the limitations originally introduced by claim 5 (now cancelled) which recites movement of the tool along at least one machine axis as the basis for repositioning the coolant nozzles. No such movement is anticipated or suggested by either of EP '616 or Eckardt et al. Hence, their combination, assuming appropriate motivation to do so, still fails to result in the invention as is now claimed.

Claims 9 and 10 are rejected as being unpatentable over EP 0 305 616 in view of Eckardt et al. (US 4,739,586) and further in view of Mason (US 1,924,162).

EP '616 and Eckardt et al. are discussed above and that discussion is hereby referred to and repeated.

Mason discloses a machine for cutting fibrous sheet material wherein a rotary cutter is actuated in forward and return motion via a pair of cables secured to opposite ends of the cutter carriage. Mason has no disclosure pertaining to delivering coolant to a machining zone and as such comprises teachings that are completely non-analogous with respect to the present claimed invention. Mason teaches a moving tool which presents absolutely no guidance or motivation to modify directing coolant flow in a manner to cure the above-noted deficiencies of EP '616 and Eckardt et al. in a way such that the present claimed invention will reasonably result.

Claims 11 and 12 are rejected as being unpatentable over EP 0 305 616 in view of Eckardt et al. (US 4,739,586) and further in view of Kalb (US 6,712,061).

EP '616 and Eckardt et al. are discussed above and that discussion is hereby

referred to and repeated.

Kalb teaches a wheeled trolley for carrying tools across a workpiece via a track and pulley/cable system. Figure 3 shows a tool support carriage 500 including coolant nozzles 512 and 513 which are supplied with cooling fluid via inlet 538 and threaded nipple 514 (column 9, lines 57-60). Also included in tool support carriage 500 is base 507 which provides an enclosure for fluid that might climb rotary shaft 509 especially when tool support carriage 500 is operated in an upside down position (column 10, lines 1-6). Additionally, while coolant nozzles 512, 513 are "positionable" due to the repositioning of tool support carriage 500 along crescents 470, 480 (Figure 1), the position of the coolant nozzles 512, 513 relative to the area of contact between the workpiece and the contact zone of the tool does not change which is contrary to the recitation of claim 1.

EP '616 teaches determining the position of the machine work table from which the machining point on the workpiece is calculated and a signal is then outputted to compute the angle of rotation of the body member 16 to direct coolant to the machining point. The computation of the angle of rotation of the body member 16 varies depending on the workpiece shape. Eckardt et al. teach positioning a coolant nozzle depending upon the position of the workpiece and the pivoting direction of the spindle arm 2. Kalb teaches movement of a tool about a fixed arcuate path with the tool being incapable of repositioning to direct coolant to a changing area of contact. Where is the motivation to combine these teachings? Applicant sees no reasonable guidance or suggestion to combine these teachings and even if reasonable motivation to combine existed, for the sake of argument, the outcome surely would not be the claimed invention given the deficiencies noted above with respect to EP '616 and Eckardt et al. Kalb simply fails to provide the teaching to rectify the deficiencies noted above in a manner such that the claimed invention reasonable results.

Conclusion

With the above remarks, Applicant believes the rejections based on EP '616 and Eckardt et al. alone or in combination with Mason or Kalb have now been overcome. In this light, withdrawal of all rejections is respectfully requested and a prompt Notice of Allowance is earnestly solicited with respect to all claims 1, 3, 4, 6-15, 17 and 18.

If the Examiner has any questions, she is cordially invited to telephone Applicant's Agent at (585) 461-8071. Should any additional fees be required in order that this paper, or any attachments hereto, be deemed a complete and timely response, the Commissioner is hereby authorized to charge Deposit Account No. 07-1425 for any such fees.

Respectfully submitted,

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